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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,672	09/30/2005	Hiromi Matsumura	278224US3X PCT	5573

22850 7590 09/22/2009  
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.  
1940 DUKE STREET  
ALEXANDRIA, VA 22314

EXAMINER
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FOGARTY, CAITLIN ANNE

ART UNIT	PAPER NUMBER
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1793

NOTIFICATION DATE	DELIVERY MODE
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09/22/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/551,672	<b>Applicant(s)</b> MATSUMURA ET AL.	
	<b>Examiner</b> CAITLIN FOGARTY	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,5,6,14 and 17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5,6,14 and 17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on July, 9, 2009 has been entered.

### ***Status of Claims***

2. Claims 1, 5, 6, 14, and 17 are pending where claim 1 has been amended. Claims 2 – 4, 7 – 13, 15, 16, and 18 – 20 have been cancelled.

### ***Status of Previous Rejections***

3. The 35 U.S.C. 103(a) rejection of claims 1, 4 – 6, 14, and 17 as being unpatentable over the "Effects of Friction Stir Welding on Microstructure of 7075 Aluminum" by Rhodes et al. in view of "Corrosion-fatigue crack growth in friction stir welded Al 7050" by Pao et al. has been maintained.

### ***Priority***

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Objections***

5. Claims 14 and 17 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the

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claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 14 and 17 depend on instant claim 4 which has been cancelled.

***Claim Rejections - 35 USC § 103***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1, 5, 6, 14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the "Effects of Friction Stir Welding on Microstructure of 7075 Aluminum" by Rhodes et al. (cited in IDS) in view of "Corrosion-fatigue crack growth in friction stir welded Al 7050" by Pao et al.

With respect to instant claims 1, 5 and 14, p. 70 of Rhodes discloses an aluminum alloy prepared by the butt joining, through friction stir welding, of aluminum sheets. Also, p. 73 of Rhodes teaches that the weld nugget (joined portion) has an average particle diameter of 60-80 nm and that the average particle diameter of the intermetallic compound in the parent metal (non-joined portion) is 50-75 nm. Therefore, the average particle diameter of the intermetallic compound in the weld nugget is within the range of 60% to 130% of the average particle diameter of the intermetallic compound in the parent metal. Also, p. 73 of Rhodes discloses that the weld nugget contains a high density of randomly oriented intragranular precipitates. This suggest that the density of precipitates increased and consequently the average distance between adjacent intermetallic compound particles decreased from that of the parent metal which is within the range recited in instant claim 1. In addition, p. 73 and 74 of Rhodes teach that

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the weld nugget has a recrystallized, fine equiaxed grain structure on the order of 2-4  $\mu\text{m}$  in diameter and that the grains of the parent metal were elongated grains. Therefore, the grains in the weld nugget have smaller diameters than those of the parent metal which is within the range disclosed in instant claim 1. The joined portion of the aluminum alloy of Rhodes is produced by friction stir welding.

Rhodes differs from instant claim 1 because it does not specifically teach that the metal sheets are made of the same *spray formed* material. However, this is a product-by-process limitation and even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

Applicant has not submitted factual evidence to show that the butt joining of metal sheets being made of the same spray formed material would create a structurally different product than the butt joining of metal sheets being made of the same, for example, cast or powder formed materials.

Rhodes also differs from instant claim 1 because it does not teach that the aluminum alloy prepared by the butt joining of metal sheets is a sputtering target. However, it would have been obvious to one of ordinary skill in the art that the aluminum alloy of Rhodes may be used as a sputtering target since it is in sheet

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form and aluminum is a common sputtering target material. Furthermore, the Discussion on p. 74 of Rhodes teaches that the microstructural changes in an aluminum alloy prepared by the butt joining of aluminum sheets by friction stir welding were found to be less drastic than those occurring in a fusion weld.

Therefore, one of ordinary skill in the art would have been motivated to apply the joining method of Rhodes to any aluminum alloy for any purpose, including sputtering targets, to maintain a microstructure similar to that of the parent metal sheets in the joined portion and therefore to maintain uniformity in the joined product. In addition, Rhodes differs from instant claim 1 because it does not teach that the joined portion has a structure characteristic of the recrystallization of the material of the joined portion by annealing and substantially without a crystal orientation characteristic of plastic flow due to friction stir welding.

However, it would have been obvious to one of ordinary skill in the art to anneal the joined portion after friction stir welding in order to re-precipitate the fine strengthening phase and restore the strength in the weld region as evidenced by p. 607 of Pao which also teaches an aluminum alloy prepared by butt joining, through friction stir welding, of aluminum plates on p. 605 and 606. Therefore, the joined portion of the aluminum alloy of Rhodes in view of Pao would have a recrystallized structure characteristic of annealing and substantially without a crystal orientation characteristic of plastic flow due to friction stir welding.

Rhodes differs from instant claims 6 and 17 because it does not teach that the target has a planar area of  $1 \text{ m}^2$  or more. However, it would have been obvious to one of ordinary skill in the art to make the sputtering target as large as

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necessary using butt joining of metal sheets through friction stir welding in order to obtain the desired size of the target where the properties of the joined portion are very similar to the properties of the non-joined portion. See MPEP 2144.04 IV A.

### ***Response to Arguments***

8. Applicant's arguments filed July 9, 2009 in regards to the instant application have been fully considered but they are not persuasive.

*Arguments are summarized as follows:*

a. None of the prior art cited in the rejection, i.e. Rhodes and Pao, is directed to a sputtering target formed using FSW. Instead, Pao is directed to materials for aircraft bodies and Rhodes is directed to joining of materials where mechanical properties must be maintained. Sputtering targets represent a distinct art having unique problems and they are required to have a highly uniform composition and metallographic structure, which is not necessarily the case for aluminum sheets.

Therefore, one skilled in the art would not have considered it obvious to have used the generic aluminum sheet of Rhodes as a sputtering target since there would be no expectation that it would satisfy the uniformity requirements of a sputtering target.

b. The newly recited claim limitation of spray forming must be considered a structural limitation since it provides distinct structural characteristics to the product, including a more uniform composition as compared to casting or powder molding. Since there is no evidence that

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the high uniformity provided by spray forming would be present or required in the generic plates of Rhodes, it is respectfully submitted that one skilled in the art would not have found it obvious to spray form these plates or to use the plates of Rhodes or Pao for a sputtering target.

*Examiner's responses are as follows:*

- a. The Discussion on p. 74 of Rhodes teaches that the microstructural changes in an aluminum alloy prepared by the butt joining of aluminum sheets by friction stir welding were found to be less drastic than those occurring in a fusion weld. Therefore, one of ordinary skill in the art would have been motivated to apply this joining method to any aluminum alloy for any purpose, including sputtering targets, to maintain a microstructure similar to that of the parent metal sheets in the joined portion and therefore to maintain uniformity in the joined product. Furthermore, it is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant. See MPEP 2144 IV.
- b. Applicant has not submitted factual evidence to show that spray forming provides distinct structural characteristics to the product that would make the product materially different from the product taught in the cited prior art. The mere statement in the instant specification on p. 16 lines 7-11 that "the metallic material used in the production of a sputtering target is preferably prepared by spray forming because the metallic material has more uniform composition or the like, compared with a metallic material prepared by casting or powder molding" is not sufficient



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evidence. Therefore, the Examiner maintains the position that the instant product would not be materially different from the product of Rhodes in view of Pao.

### ***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAITLIN FOGARTY whose telephone number is (571)270-3589. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Roy King/  
Supervisory Patent Examiner, Art  
Unit 1793

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